OTTAWA NATIONAL WILDLIFE REFUGE COMPLEX

(OTTAWA, CEDAR POINT, DARBY, NAVARRE NWR'S)

OAK HARBOR, OHIO

ANNUAL WATER MANAGEMENT PROGRAM

1985

NATIONAL WILDLIFE REFUGE SYSTEM
FISH AND WILDLIFE SERVICE
U. S. DEPARTMENT OF THE INTERIOR

WATER MANAGEMENT PLAN - 1985

GENERAL DESCRIPTION OF PLAN

This annual water management plan for the Ottawa NWR Complex will provide for moist soil plant production and repair of damaged dikes while maintaining nesting, feeding and brood habitat for a wide variety of water-related birds and mammals.

Moist Soil units 3, 4, 5, 7a, 7b, 8a, and 8b will be managed to produce moist soil plants to provide a variety of seeds and invertebrates. Of these, MS-4 & 5 will be lowered below actual desired levels to allow for dike rebuilding. Unit 7b will also be dryed completly for dike repair, but only for as long as neccessary to complete the repairs. MS-3 will be gradually drawn down to allow moist soil production while still maintaining some brood habitat in the southeast corner of the unit. MS-6 will be drawn down as much as possible for dike repair and woody vegetation control.

Pool 2b, 2c, and pool 3 will be drawn down for dike repairs and restoration of the marsh and moist soil plant vegetation. Pool 2a will also be lowered after pumping is completed on above units. Heavy moist soil plant production is expected on these units as the bottoms expose. Pool 1 and the Mini-marsh will provide feeding and brood habitat in the headquarters area. The mini-marsh will be held high to encourage muskrats to control cattail.

Pools 4, 5, 7, 8 and unit 1 are listed as pools for the refuge, but all water control has been lost and no potential exists for restoration without major construction funds. Thus they are not included in this plan.

Vegetation at Cedar Point is in good condition and water levels will be held stable to maintain this condition, except for a slight raising during the late summer to allow better airboat access for the control of purple loosestrife.

Pools 1, 2, and 3 at Darby will also be held steady and pool 4 will be lowered as much as possible by gravity draining to encourage revegetation of the pool edges.

1984 Water Level Management

Water level staff gauges were either not present or not accurate on most of the pools. Gauges were installed on the Darby pools in mid-summer and on some of the Ottawa pools during the fall. Because of lack of gauges, it was difficult to accurately access and describe the water levels during the year. It was also difficult to correlate these levels to past water levels, management records, or plans. Most management was done on a judgement basis with the last water management plan(1983) used as guide. Though we now have such gauges, the 1985 levels will be difficult to tie to a specific level for the purposes of this plan. Levels will be again managed according to judgement, but accurate records kept to determine proper levels for future years. Notes will also be made as to acreages flooded, water depths, etc at various levels to gain information valuable in future management. Additional gauges will be installed as needed.

Thus the levels given in this plan represent only estimates of the past and planned levels.

The Ottawa Complex has never quanitifed the vegetative response to water level management. In 1985, infared aerial photos and photo interpretation will provide information on just exactly what, where, and how much of the various plant species on each unit. With that information and detailed water level records, we will be able to fine tune the program and achieve the desired results in each unit.

A major factor affecting water management at Ottawa is the purple loosestrife invasion. Each unit will be closely inspected in July and August and sprayed if any plants are found. The progress of the invasion and control efforts will be reported for each unit in future water management plans. This plant may make annual drawdowns much less desirable and may seriously effect our management options.

Unit Summary for FY85

Ottawa NWR

Pool 1 - Hold steady at approximately 1984 levels.

Pool 2 - Drawdown for dike repair and revegetation.

Pool 3 - Drawdown, if possible, for dike repair and revegetation.

Pool 6 - Gravity fill and hold as steady as possible at a moderate level.

Mini-Marsh - Hold stable and slightly highforcattail control.

Show Pool - Hold steady at approximately 573

Headquarters Pool - Lower during summer by gravity only.

MS-3 - approximately the same levels as 1984. Gradual drawdown starting in mid-May.

MS-4 - Drawdown for dike repair.

MS-5 - Drawdown for dike repair. (or moist for moist soil production).

MS-6 - Drawdown for dike repair and vegetation control.

MS-7a - Drawdown for moist soil production, disk a portion when first dry. Then hold moist for early summer and allow to dry further in late summer.

MS-7b - Drawdown for rotational farming of millet and buckwheat, dry completely in late summer for dike repair. Flood in fall.

MS-8a - Drawdown for rotational farming of millet. Flood in fall.

MS-8b - drawdown to 572 for moist soil production by May 15th, then hold for early summer months, Lower further during July for evaluation of late drawdown.

Cedar Point NWR

All pools - Hold steady, raise slightly during late summer for better boat access.

Darby NWR

Pools 1, & 3 - Hold steady to maintain vegetation

Pool 2 - Lower to moderate level (572.0) and hold during summer.

Pool 4 - Lower as far as possible during late spring and summer by gravity draining to increase vegetation.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit Pool 1

Maximum elevation permissible 573

Flowline elevation of lowest drain structure 570

Elevation of general pool bottom 569

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	571.5	572.0
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	572.0	"
15	"	"
Apr. 1	"	"
15	"	"
May. 1	"	"
15	"	"
Jun. 1	572.0	"
15	"	571.5
Jul. 1	"	571.0
15	"	570.0
Aug. 1	"	"
15	571.5	"
Sept 1	"	"
15	"	571.5
Oct. 1	571.4(Water Guage	"
15	" Installed)	"
Nov. 1	"	"
15	571.8	"
Dec. 1	571.9	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. Pool 1 was managed to provide a stable water level throughout the year by draining or adding water as neccessary to stablize water levels. New water level guages were installed in the unit to improve water records.

Part 2. This unit is currently in good condition with substantial stands of cattail and aquatic smartweeds. Open water areas are only slightly greater than desired, but they were devoid of submergent vegetation in approximately one-half of the open water areas. Muskrat activity was high with houses noted throughout the unit.

B.2 Objectives of the 1985 Proposed Water Levels.

Excess spring water will be allowed to drain off in April and May to bring the unit to approximately 570.0 (571.0) by June 15. Water will be held at this level until Sept 1st when it will be raised to 571.5 by gravity filling. If a connection is cleaned between pool 1 and the adjacent Ohio DNR marsh unit in FY85, the unit could be pumped down providing for active water level control if funds are available in future years for electric costs.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit Pool 2A

Maximum elevation permissible 573.0

Flowline elevation of lowest drain structure 569.0

Elevation of general pool bottom 568.5

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	573.0	569.5
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	569.7
15	"	"
Apr. 1	"	570.0
15	"	"
May. 1	572.5	570.0
15	572.0	"
Jun. 1	571.0	569.0
15	570.5	"
Jul. 1	570.0	568.0
15	"	"
Aug. 1	"	"
15	"	"
Sept 1	569.5	570.0
15	"	"
Oct. 1	569.4(Installed	571.0
15	569.6 Gauges)	"
Nov. 1	569.4	"
15	569.3	"
Dec. 1	569.3	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. Pool 2a water levels were lowered during May by pumping. No water was added during the summer and evaporation losses further lowered levels as low as 569.5 by October 1st. No water was added during the fall.

Part 2. Vegetation response in this unit is poor and the unit is primarily open water. Water levels were not lowered sufficiently during the summer to significantly improve the marsh habitat. Shorebird, tern, and gull use was high in the fall on the exposed mudflats.

B.2 Objectives of the 1985 Proposed Water Levels.

Excess water will be removed via pumping as part of the overall pool 2 dewatering. Water levels will be lowered to the degree practical through existing control structures into pool 2b. Further lowering will be done by pumping only if funds, equipment, and time is available after dewatering of other units. Water will be added only to cover the highest elevations.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit Pool 2B

Maximum elevation permissible 573.0

Flowline elevation of lowest drain structure 569.5

Elevation of general pool bottom 568.5

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	573.0	570.8
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	"
15	"	"
Apr. 1	"	570.5
15	"	569.0
May. 1	"	568.5
15	572.0	568.5
Jun. 1	571.0	568.5
15	"	dry
Jul. 1	"	dry
15	"	"
Aug. 1	570.5	"
15	"	"
Sept 1	"	"
15	"	"
Oct. 1	570.5(Install	570.0
15	" Gauges)	"
Nov. 1	570.6	571.0
15	"	"
Dec. 1	570.9	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. Water levels in pool 2b were lowered by pumping in May but leakage of water control structures prevented a successful drawdown. Levels increased during the summer until the structures were repaired. Levels stabilized during Sept and October and raised only slightly during the remainder of the year.

Part 2. The drawdown was not sufficient to increase the vegetation significantly. Carp and wave action prevented any vegetation growth, but levels were lowered to stop the severe bank erosion that had occurred in previous years.

B.2 Objectives of the 1985 Proposed Water Levels.

This unit will be completely dewatered during early summer for dike resloping. Crisifulli pumps will be used during April to completely dewater the unit by May 1st. Smaller pumps may be required for small low pockets to lower water levels to the degree neccessary to operate equipment within the pool. While dry the eroded dikes will be resloped and rip-rapped as neccessary to prevent further damage. The areas will be reflooded only to the point of covering the highest points in the unit and kept below a level where dike damage may occur to any still unprotected dikes.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit Pool 2C

Maximum elevation permissible 573.0

Flowline elevation of lowest drain structure 569.0

Elevation of general pool bottom 568.0

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	573.0	570.8
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	"
15	"	"
Apr. 1	"	571.0
15	"	"
May. 1	"	570.5
15	572.0	569.0
Jun. 1	571.0	568.0
15	"	dry
Jul. 1	"	dry
15	"	"
Aug. 1	570.5	"
15	"	"
Sept 1	"	"
15	"	"
Oct. 1	570.5(Installed	570.0
15	" Gauges)	"
Nov. 1	570.6	571.0
15	"	"
Dec. 1	570.9	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. Water levels in pool 2c were lowered by pumping in May but leakage of water control structures prevented a successful drawdown. Levels increased during the summer until the structures were repaired. Levels stabilized during Sept and October and raised only slightly during the remainder of the year.

Part 2. The drawdown was not sufficient to increase the vegetation significantly. Carp and wave action prevented any vegetation growth, but levels were lowered to stop the severe bank erosion that had occurred in previous years.

B.2 Objectives of the 1985 Proposed Water Levels.

This unit will be completely dewatered during the summer for dike resloping. Crisifulli pumps will be used during May and June to completely dewater the area. Smaller pumps may be required for small low pockets to lower water levels to the degree neccessary to operate equipment within the pool. While dry the eroded dikes will be rebuilt and rip-rapped as neccessary to prevent further damage. Water will be added in the fall only to the point of just covering the highest elevations and held below any level where still unprotected dikes will be damaged.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit Pool 3

Maximum elevation permissible 572.0

Flowline elevation of lowest drain structure 571.0

Elevation of general pool bottom 571.0

A.1 Water surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	Flucuated daily with Lake levels entire year because of major breaks in dikes.	Flucuate with lake
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	"
15	"	"
Apr. 1	"	"
15	"	"
May. 1	"	"
15	"	"
Jun. 1	"	"
15	"	572.0
Jul. 1	"	570.0
15	"	dry
Aug. 1	"	"
15	"	"
Sept 1	"	570.0
15	"	"
Oct. 1	"	571.0
15	"	"
Nov. 1	"	571.5
15	"	"
Dec. 1	"	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. Water levels flucatated with lake levels each day as the result of major breaks in the south and west dikes. The west dike was closed in mid-September by the pool 4 contractor, but at least one large break remains in the south dike.

Part 2. Approximate 75% of the pool, primarily on the east end, is unproductive open water/mudflat. The remainder is mostly heavy cattail. No change in the vegetation was noted during the year.

B.2 Objectives of the 1985 Proposed Water Levels.

Attempts will be make to repair the break in the south dike using sheet piling and sandbags. If this can be successfully done, the unit will be pumped dry to allow further repair of the south dike using a bulldozer. Water levels will then be held low during the summer months to allow revegetation and reflooded in the fall. If repair attempts are not successful, no management will be done.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit Pool 6

Maximum elevation permissible 573.0

Flowline elevation of lowest drain structure 569.0

Elevation of general pool bottom 570.0

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	No water gauges present, All elevations are estimates	571.5
15		"
Feb. 1	572.0	"
15	"	572.0
Mar. 1	"	"
15	"	572.5
Apr. 1	"	"
15	"	"
May. 1	"	"
15	"	"
Jun. 1	"	"
15	"	"
Jul. 1	571.0	"
15	"	"
Aug. 1	"	"
15	"	"
Sept 1	"	"
15	"	"
Oct. 1	"	"
15	"	"
Nov. 1	571.5	"
15	"	"
Dec. 1	"	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1 No actual management of this pool was done during the year. Water levels were allow to lower by evaporation during the summer, but lake levels were not high enough during the fall to significantly raise the pool, resulting in much lower than desired for the fall period. The lack of automatic flow structures into this unit severly hampers the management of the unit as all water flow must be closely monitiored and twice daily adjustments made to the structure settings. In addition, breaks and ratholes in dikes do not allow for precise management.

Part 2 Little change occured to the unit during the year, but the cattail-open water areas of the pool is quite good.

B.2 Objectives of the 1985 Proposed Water Levels.

Water will be held stable in this unit during the year. The degree of management will depend the degree that the dikes will hold water. If is unlikely that any significant repair of these dikes can be done this year. Until significant repairs can be done, little actual water control can be done. In addition, water flow of this unit depends upon water levels in the adjacent state wildlife area as water flow must come through the state area. Currently, the state must raise the level of their canal before we can take on water.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit Mini-Marsh

Maximum elevation permissible 573.0

Flowline elevation of lowest drain structure None

Elevation of general pool bottom 570.5

A.1 Water surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	572.0	No flooding or other maangement of this unit will be done until the pump servicing the unit is repaired.
15	"	
Feb. 1	"	
15	"	
Mar. 1	"	"
15	"	"
Apr. 1	"	"
15	"	"
May. 1	"	"
15	571.5	"
Jun. 1	"	"
15	571.0	"
Jul. 1	"	"
15	"	"
Aug. 1	570.5	"
15	"	"
Sept 1	"	"
15	"	"
Oct. 1	"	"
15	"	"
Nov. 1	"	"
15	"	"
Dec. 1	"	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. Water was held in the mini-marsh until mid-summer when the pump failed completely, leaving no method of adding water other than portable pumps. Portable pumps were not used due to difficultly in set-up and lack of time. Evaporation losses allowed the unit to go dry by late summer and remained dry the remainder of the year.

Part 2. This unit is now almost completely covered with solid cattail. Lack of water reduced the muskrat population which prevented any "eat-outs".

B.2 Objectives of the 1985 Proposed Water Levels.

The lack of pumping facilities will preclude any significant water management of this unit until the Mini-Marsh electric pump can be repaired. No water level control will be scheduled this year. Portable pumping may be used to fill the marsh in the late spring if time permits. If the electric pump for this unit can be repaired, water levels will be held slightly high to encourage cattail control by muskrats.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit Show Pool

Maximum elevation permissible 573.00

Flowline elevation of lowest drain structure 569.00

Elevation of general pool bottom _____

A.1 Water surface Elevations for Past Year.		B.1 Planned Elevations for Program Year.	
Date	Water Surface Elevations	Date	Water Surface Elevations
Jan. 1	No Water Gauges Present during Year	Jan. 1	Water levels to be held stable during the entire year at approximately 573.0
15		15	"
Feb. 1	Water was drawn down in late May to approx. 571.5 from the spring level of 573.0. In Sept, it was gravity filled to 573.0	Feb. 1	"
15	"	15	"
Mar. 1	"	Mar. 1	"
15	"	15	"
Apr. 1	"	Apr. 1	"
15	"	15	"
May. 1	"	May. 1	"
15	"	15	"
Jun. 1	"	Jun. 1	"
15	"	15	"
Jul. 1	"	Jul. 1	"
15	"	15	"
Aug. 1	"	Aug. 1	"
15	"	15	"
Sept 1	"	Sept 1	"
15	"	15	"
Oct. 1	"	Oct. 1	"
15	"	15	"
Nov. 1	"	Nov. 1	"
15	"	15	"
Dec. 1	"	Dec. 1	"
15	"	15	"
31	"	31	"

A.2 Effects of past year's water levels.

Part 1. After the spring runoff period, this pool was reduce to approximately 571.5 and held there during the summer. In September, it was raised to approximately 573.0 by gravity filling and remained there the remainder of the year.

Part 2. This pool consists of a considerable amount of high ground and some borrow pits of deeper water with only a small area of actual marsh. Little aquatic vegetation change was noted during the year. However, much of the higher elevations are becoming invaded with woody vegetation.

B.2 Objectives of the 1985 Proposed Water Levels.

Water levels will again be held stable for the year. Because of the small area of actual marsh, little management time will be spent in manulipation of the water levels within this unit.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit Headquarters Pool

Maximum elevation permissible 572.5

Flowline elevation of lowest drain structure 570.0

Elevation of general pool bottom 570.0

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	No Water Gauges Present-All elevations estimated	
15		572.0
Feb. 1	Break in dike allowed	"
15	water to fluctuate with lake elevations, but at	"
Mar. 1	a slower rate with a	"
15	minimum elevation of 571.5. Break repaired	"
Apr. 1	in mid-Sept. and levels	"
15	held at approximately 572.4 after Oct. 1st.	"
May. 1	"	Remove spring runoff
15	"	"
Jun. 1	"	"
15	"	571.0
Jul. 1	"	"
15	"	"
Aug. 1	"	"
15	"	"
Sept 1	"	572.5
15	"	"
Oct. 1	"	"
15	"	"
Nov. 1	"	"
15	"	"
Dec. 1	"	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. A break in a dike allowed water to fluctuate with lake elevations, but at a lower rate with a minimum elevation of 571.5. The break was repaired in mid-Sept. and levels held at approximately 572.4 after Oct. 1st.

Part 2. This pool contains little submergent vegetation in the open water area and only a narrow fringe of emergent vegetation along the eastern and southern edges. Little change was noted during the year.

B.2 Objectives of the 1985 Proposed Water Levels.

Although the pool would greatly benefit from a complete drawdown, time and funds will not be available for any drawdown beyond that which gravity draining will permit. Thus, water elevations will be lowered during the summer months to the degree possible by allowing natural drainage to the lowest lake elevation. It is expected that this will expose some of the bottom and provide for some plant growth. The area will be returned to elevation 572.5 during the fall.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit MS-3

Maximum elevation permissible 574.0

Flowline elevation of lowest drain structure 570.0

Elevation of general pool bottom 572.0

A.1 Water surface Elevations for Past Year.

Date	Water Surface Elevations
Jan. 1	574.0
15	"
Feb. 1	"
15	"
Mar. 1	"
15	"
Apr. 1	573.5
15	"
May. 1	573.0
15	"
Jun. 1	"
15	"
Jul. 1	"
15	572.5
Aug. 1	"
15	572.0
Sept 1	"
15	573.0
Oct. 1	573.5
15	573.8
Nov. 1	"
15	"
Dec. 1	"
15	"
31	"

B.1 Planned Elevations for Program Year.

Water Surface Elevations
573.6
"
"
"
"
"
"
"
"
"
"
573.0
572.8
572.6
572.5
572.5
572.0
573.5
573.5
573.8
"
"
"
"
"

A.2 Effects of past year's water levels.

Part 1. Water was held in MS-3 during the spring and early summer. Because work on the main pump ditch prevented pumping during the late summer period, evaporation and seepage losses were not replaced, resulting in lower levels than planned. Water was added by pumping on Sept. and levels brought up to 573. to reflood the entire area.

Part 2. Moist soil plant response was excellent on the unit. Very little woody growth was noted due to the control efforts in 1983. During October and November, the unit recieved the highest duck use per acre for the entire refuge complex and probably the highest use per acre for the State of Ohio.

B.2 Objectives of the 1985 Proposed Water Levels.

Because of plans to completely dewater MS-4, 5, & 6 for scheduled dike repair, water will be maintained in the SE corner of MS-3 to provide brood habitat. Water will be held at a moderate level of 572.00 to 573.00 during the summer. This level is expected to hold water in the deeper areas but allow the production of moist soil foods in the remainder ofthe unit. The entire unit will be reflooded approximately Sept 15th.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit MS-4

Maximum elevation permissible 574.0

Flowline elevation of lowest drain structure 570.0

Elevation of general pool bottom 571.75

A.1 Water surface Elevations for Past Year.		B.1 Planned Elevations for Program Year.	
Date	Water Surface Elevations		Water Surface Elevations
Jan. 1	574.0		573.6
15	"		"
Feb. 1	"		"
15	"		"
Mar. 1	"		"
15	"		"
Apr. 1	573.5		"
15	"		573.0 (573.5)
May. 1	573.0		572.5 (")
15	"		572.0
Jun. 1	"		dry (572.0)
15	"		"
Jul. 1	"		"
15	572.5		"
Aug. 1	"		"
15	572.0		"
Sept 1	"		"
15	573.0		"
Oct. 1	573.5		573.5
15	573.8		573.8
Nov. 1	"		"
15	"		"
Dec. 1	"		"
15	"		"
31	"		"

A.2 Effects of past year's water levels.

Part 1. Beginning in May, water was removed from this unit by using the main moist soil pump. The unit was dry by June 1st. During July and August, major areas of woody vegetation were mowed using a brush cutting mower and several acres of cattails were disked. In addition, approximately 20 acres of cattails were sprayed with roundup. The area was reflooded beginning Oct 15th to an elevation of 573.8.

Part 2. The objectives of removal of the cattails and woody growth by mechanical means were met and the response by moist soil plants was excellent in any areas not covered with cattails or grassy vegetation. The millet recieved heavy goose use before flooding and all waterfowl used the area after the flooding.

B.2 Objectives of the 1985 Proposed Water Levels.

Major rehab of the north dike of this unit along Tank Ditch is scheduled for 1985. This unit will be drained completely starting May 15th to facilate this work. Additional brush mowing will be done to eliminate any remaining woody growth.

The unit will be reflooded in the fall to 573.00 upon completion of the dike repair. Moist soil conditions will be established as soon as repairs and woody growth control is accomplished.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit MS-5

Maximum elevation permissible 573

Flowline elevation of lowest drain structure 567

Elevation of general pool bottom 570-571

A.1 Water surface Elevations for Past Year.

Date	Water Surface Elevations
Jan. 1	574
15	"
Feb. 1	"
15	"
Mar. 1	"
15	"
Apr. 1	"
15	"
May. 1	573
15	572
Jun. 1	570
15	dry
Jul. 1	"
15	"
Aug. 1	"
15	"
Sept 1	"
15	"
Oct. 1	"
15	"
Nov. 1	"
15	571
Dec. 1	572
15	572.5
31	"

B.1 Planned Elevations for Program Year.

Water Surface Elevations	
572.5	
"	
"	
"	
"	
"	( ) elevations if dikework cancelled
"	
572	
570 (571)	
570 (571)	
569 (571)	
dry (570)	
dry (570)	
dry (570)	
dry	
571	
572	
"	
"	
"	
"	
572.5	
572.5	
572.5	

A.2 Effects of past year's water levels.

Part 1. Beginning in May, water was removed for this unit by using the main moist soil pump. The unit was dry by June 1st. During July and August, major areas of woody vegetation were mowed using a brush cutting mower or disked with a heavy disk and dozer where the brush and trees were to large for the mower to cut. A root rake was used to clear some small areas. In addition, approximately 10 acres of brush and cattails were sprayed with roundup. During September and October, the south and east banks were resloped and rip-rapped to curtail bank erosion. The area was reflooded beginning Nov. 10th to an elevation of 571. Pumping was used in late Nov. to further raise water levels to 572.5.

Part 2. The objectives of removal of the woody growth by mechanical means were met and the response by moist soil plants was excellent. Good stands of millet grew in the mowed areas. In some areas, velvet leaf was a problem. The millet recieved heavy goose use before flooding and mallard and black duck use exceed 10,000 ducks per day during early December.

B.2 Objectives of the 1985 Proposed Water Levels.

Major rehab of the north dike of this unit along Tank Ditch is scheduled for 1985. This unit will be drained completely starting May 15th to facilate this work. Additional brush mowing will be done to eliminate any remaining woody growth.

In the event that the dike rehab is cancelled, water will be held until June 1st, then lowered to approximately 571 until July 1st, then lowered additionally to 569.5-570 to stimulate additional moist soil plant growth.

The unit will be reflooded in the fall to 573.00 upon completion of the dike repair.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit MS-6

Maximum elevation permissible 572.0

Flowline elevation of lowest drain structure None

Elevation of general pool bottom 571.5

A.1 Water surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	Flucuated with the lake levels but at a slower rate.	571.6
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	572.0
15	"	"
Apr. 1	"	"
15	"	"
May. 1	"	"
15	"	"
Jun. 1	"	"
15	"	"
Jul. 1	"	571.5
15	"	"
Aug. 1	"	571.0
15	"	dry
Sept 1	"	"
15	"	"
Oct. 1	"	"
15	571.5(Partially repaired dikes	"
Nov. 1	"	572.0
15	"	"
Dec. 1	"	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. No actual water control was done in this unit due to the damaged dikes in the unit which prevent the holding of water levels. Both the north and south dikes of the unit have large muskrat holes and other breaks that allow the water to flucuate with lake levels. However, water levels receded during the late summer to the point that most of the unit was dry enough to allow the mowing of large areas of cottonwood and willow with a tractor and rotary mower. In addition, a major hole in the south dike was located and repaired. Repair was started on the north dike but conditions were still to wet to allow completion.

Part 2. This unit was almost 100% vegetated with heavy cattail and/or willow & cottonwood due to lack of water control and lack of management since it was removed from agricultural production several years ago. At present, it is of little value to waterfowl. All woody vegetation of large sapling size and smaller was mowed in September when leke levels were low enough to allow tractors to operate. Some areas of 5-8" cottonwood trees still exist which will require removal with a dozer or hand-cutting. A major muskrat hole in the south dike was also repaired.

B.2 Objectives of the 1985 Proposed Water Levels.

The water levels will be held as low as possible during 1985 and attempts will be make to dewater the entire unit by pumping in order to make repairs to the damaged dikes. If the south dike has no more major holes, the north dike can be repaired by plugging the adjacent ditch and pumping the unit dry. The North dike will be repaired using a small bulldozer to build up the side slope for the entire length. If possible, major repairs will also be make to the south dike if the water can be completely removed. Cattail and brush control will be done by chemical and mechanical means.

If dike repairs are successful, the water will be raised in the unit as early in the fall or summer as possible to flood out the woody vegetation and held through the fall.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit MS-7A

Maximum elevation permissible 573.5

Flowline elevation of lowest drain structure 570.5

Elevation of general pool bottom 572.5

A.1 Water surface Elevations for Past Year.		B.1 Planned Elevations for Program Year.	
Date	Water Surface Elevations		Water Surface Elevations
Jan. 1	573.5		573.0
15	"		"
Feb. 1	"		"
15	"		"
Mar. 1	"		"
15	"		"
Apr. 1	"		573.0
15	"		572.5
May. 1	"		572.0
15	573.0		dry (disk by 5/21)
Jun. 1	572.5		572.0
15	dry		"
Jul. 1	"		"
15	"		"
Aug. 1	"		"
15	"		"
Sept 1	"		572.5
15	"		"
Oct. 1	"		"
15	"		"
Nov. 1	"		"
15	"		"
Dec. 1	"		573.0
15	"		573.5
31	"		"

A.2 Effects of past year's water levels.

Part 1. Water levels in MS-7A were held high to completely flood the unit until mid-May and then slowly drawn down until late June. A small amount of water was held in the ditch and northeast corner.

Part 2. Vegetation consisted primarily of beggars tick with only small amounts of millet produced. Carex sp. and some cattail remained near the permanent water areas. Water levels were possibly held too low and drawdown too late for good millet and smartweed production. Shorebird use was excellent in May and June with large flocks of sandpipers and dunlins observed. Duck use was excellent in April and May. Approximately 500 mallards were observed in the unit each day during July and August.

B.2 Objectives of the 1985 Proposed Water Levels.

Water levels will again be held high (573+) until early May and then dewatered as quickly as possible. The areas will be disced and the water levels returned to aproximately 572.0 which will create a moist soil condition. The dike separating this dike from MS-7B may be repaired if time and conditions permit. Discing will be done in such a way to allow evaluation of the soil treatment.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit MS-7B

Maximum elevation permissible 573.0

Flowline elevation of lowest drain structure 570.5

Elevation of general pool bottom 571.5

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	573.5	573.0
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	"
15	"	"
Apr. 1	"	"
15	"	"
May. 1	"	"
15	573.0	"
Jun. 1	572.0	572.5
15	"	572.0
Jul. 1	571.5	571.5
15	"	"
Aug. 1	"	"
15	"	dry
Sept 1	"	571.5
15	"	"
Oct. 1	"	572.5
15	"	573.0
Nov. 1	"	"
15	"	"
Dec. 1	"	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. Water levels in MS-7b were held high to completely flood the unit until late-May and then slowly removed by pumping to dry most of the unit. A small amount of water was held in the ditch and central section on the north side.

Part 2. Vegetation consisted primarily of beggars tick with only small amounts of millet produced. Aquatic smartweed growth occurred in the permanent water areas. Water levels were possible held to low for good millet and smartweed production. The southeast half of the unit produced only upland grasses and annuals, due to the higher elevation of this section. Duck and shorebird use was high in the spring with duck use continuing through the summer.

B.2 Objectives of the 1985 Proposed Water Levels.

Water levels will again be held high (573+) until mid or late May and then lowered to approximately 572.0 which will expose most of the unit. The unit will be plowed and/or disced and planted to millet and buckwheat. The dike separating this dike from Crane Creek will be repaired if time and conditions permit. Flooding will occur in late September.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit MS-7C

Maximum elevation permissible 572.0

Flowline elevation of lowest drain structure 570.0

Elevation of general pool bottom 571.5

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	No management of this unit throughout year	No management of this unit will be done this year.
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	"
15	"	"
Apr. 1	"	"
15	"	"
May. 1	"	"
15	"	"
Jun. 1	"	"
15	"	"
Jul. 1	"	"
15	"	"
Aug. 1	"	"
15	"	"
Sept 1	"	"
15	"	"
Oct. 1	"	"
15	"	"
Nov. 1	"	"
15	"	"
Dec. 1	"	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. No water was present in this unit due to lack of control.

Part 2. Vegetation is primarily upland vegetation Little waterfowl use other than nesting cover is furnished.

B.2 Objectives of the 1985 Proposed Water Levels.

No functional management of this unit will be done until the rehab of the mini-marsh pump is made which will allow pumping of the area.

A.2 Effects of past year's water levels.

Part 1. Water was removed from this unit during May to completely dewater the unit by early June. It was held dry the entire summer and reflooded in the early fall by gravity flow.

Part 2. Moist soil plant production was good, but a considerable amount of velvetleaf was present over much of the area. A substantial portion of the eastern end of the unit contained small cottonwood trees, 2 to 3 feet in height.

B.2 Objectives of the 1985 Proposed Water Levels.

This unit will be again dewatered in April and early May. When dry it will be plowed, disced, and planted by a coop-farmer to millet. The crop rotation should reduce the woody invasion. Flooding will be done in late September.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit MS-8B

Maximum elevation permissible 572.5

Flowline elevation of lowest drain structure 570.0

Elevation of general pool bottom 570.5

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	572.5	572.5
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	"
15	"	"
Apr. 1	"	"
15	"	"
May. 1	"	572.0
15	572.0	"
Jun. 1	571.5	572.0
15	571.0	571.5
Jul. 1	570.0	571.5
15	dry	571.5
Aug. 1	"	dry
15	"	dry
Sept 1	"	572.0
15	572.0	572.5
Oct. 1	"	"
15	572.5	"
Nov. 1	"	"
15	"	"
Dec. 1	"	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. Water was removed from this unit during May to completely dewater the unit by early June. It was held dry the entire summer and reflooded in the early fall by gravity flow.

Part 2. Moist soil plant production was only fair, and a considerable amount of beggar's tick and velvetleat was present over much of the area. This vegetation may indicate that the unit was too dry for optimum moist soil plants.

B.2 Objectives of the 1985 Proposed Water Levels.

This unit will be dewatered in early May, which is slightly ealier than last year. Water will be held at a level to create a moist condition over most of the area. It may be lowered later in the summer once a dominant vegetation establishes on the higher areas. Complete reflooding will be done in early fall

Annual Water Management Plan for 1985

Refuge Cedar Point NWR Water Unit Pool 1

Maximum elevation permissible 574.0

Flowline elevation of lowest drain structure 570.0

Elevation of general pool bottom 571.0

A.1 Water surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	573.6	573.1
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	"
15	"	"
Apr. 1	573.8	"
15	573.3	"
May. 1	573.0	"
15	"	"
Jun. 1	"	"
15	572.9	"
Jul. 1	572.8	"
15	572.6	573.5
Aug. 1	572.9	"
15	"	"
Sept 1	"	573.1
15	"	"
Oct. 1	"	"
15	573.0	"
Nov. 1	573.1	"
15	"	"
Dec. 1	573.2	"
15	"	"
31	"	

A.2 Effects of past year's water levels.

Part 1. The water was held stable between 572.6 and 573.1 during the entire year, except during the spring runoff period. Excess water was drained and the unit slowly lowered to 572.6 by mid-July. It was then raised slightly through the fall months.

Part 2. This unit showed excellent distribution of various marsh emergents and open water. The open water areas of the eastern portion of the pool were covered with dense submergent vegetation. The stable water levels provided for little change in vegetation over previous years and provided ideal conditions for muskrats. Due to the high spring muskrat breeding population, dense emergents were opened up by numerous small "eatouts" in the fall. Waterfowl production was good with several redhead broods observed. Purple loosestrife was noted as a major problem in the western portion.

Part B. Objectives of the 1985 Water Management

Water levels will be held stable to maintain current conditions and at a point to avoid exposed mudflats. Howver, because of the need to control the invasion of purple loosestrife, the pool level will be brought to a slightly higher level during July and August. This will allow better airboat access. Levels will be held at approximately 573.5 during the July-August period, providing an airboat is available for use.

Annual Water Management Plan for 1985

Refuge Cedar Point NWR Water Unit Pool 2

Maximum elevation permissible 574.0

Flowline elevation of lowest drain structure 570.0

Elevation of general pool bottom 571.0

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	573.6	573.1
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	"
15	"	"
Apr. 1	573.8	"
15	573.3	"
May. 1	573.0	"
15	"	"
Jun. 1	"	"
15	572.9	"
Jul. 1	572.8	"
15	572.6	573.5
Aug. 1	572.9	"
15	"	"
Sept 1	"	573.1
15	"	"
Oct. 1	"	"
15	573.0	"
Nov. 1	573.1	"
15	"	"
Dec. 1	573.2	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. This pool has no funtional water control of its own and is managed as a part of pool 1. Water was held stable between 572.6 and 573.1 during the entire year, except during the spring runoff period. Excess water was drained and the unit slowly lowered to 572.6 by mid-July. It was then raised slightly through the fall months.

Part 2. This unit shows excellent distribution of various marsh emergents and open water. In open water areas, dense stands of submergent vegetation were noted. Stable water levels provided for little change in vegetation over previous years, except for a minor increase in cattail growth. Purple loosestrife was noted invading on the western portion and was sprayed.

Part B. Objectives of the 1985 Water Management

Water levels will be held stable to maintain the current conditions. Howver, because of the needs to control the invasion of purple loosestrife in the pool levels will be brought to slightly higher levels during July and August. This will allow better airboat use. Levels will be held at approximately 573.5 during the July-August period, providing an airboat is available for use.

Annual Water Management Plan for 1985

Refuge Ottawa NWR Water Unit Pheasant Farm

Maximum elevation permissible 574.0

Flowline elevation of lowest drain structure 571.0

Elevation of general pool bottom 571.0

A.1 Water surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations		Water Surface Elevations
Jan. 1	572.5	No water gauges, all elevations are estimated	573.0
15	"		"
Feb. 1	572.8		"
15	"		"
Mar. 1	"		"
15	573.0		"
Apr. 1	"		"
15	"		"
May. 1	"		"
15	"		"
Jun. 1	572.5		"
15	"		"
Jul. 1	"		"
15	572.2		"
Aug. 1	572.5		"
15	"		"
Sept 1	"		"
15	"		"
Oct. 1	"		"
15	"		"
Nov. 1	"		"
15	"		"
Dec. 1	"		"
15	"		"
31	"		"

A.2 Effects of past year's water levels.

Part 1. The water was held stable between 572.2 and 572.8 during the entire year, except during the spring runoff period. Excess water was drained and the unit slowly lowered to 572.2 by mid-July. It was then raised slightly in the late summer, but not as high as desired.

Part 2. This unit shows good distribution of various marsh emergents and open water. Howver, cattail growth is heavy to solid in some areas and the unit might benefit from cattail control measures. The stable water levels provided for little change in vegetation over previous years, except for a minor increase in cattail growth. Purple loosestrife was invading quite heavily on much of the area and major control efforts were made during August.

Part B. Objectives of the 1985 Water Management

Water levels will be held stable, but at a higher level than the past year to encourage cattail control by increasing muskrat populations and to control the invasion of purple loosestrife in the pool. Levels will be held at approximately 573.0 during the year.

Annual Water Management Plan for 1985

Refuge Darby NWR Water Unit Pool 1

Maximum elevation permissible 573.0

Flowline elevation of lowest drain structure 566.6

Elevation of general pool bottom 569.0

A.1 Water surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	573.2	572.0
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	573.8	"
15	574.1	"
Apr. 1	573.6	"
15	572.9	"
May. 1	572.8	"
15	"	"
Jun. 1	572.9	"
15	"	"
Jul. 1	572.8	"
15	572.7	"
Aug. 1	572.4	"
15	572.2	"
Sept 1	572.1	"
15	571.8	"
Oct. 1	"	"
15	"	"
Nov. 1	571.6	"
15	"	"
Dec. 1	571.8	"
15	"	"
31	"	

A.2 Effects of past year's water levels.

Part 1. Water levels in this unit reached 574.1 during the spring runoff period of late March, but were reduced to 572.9 by mid-April and kept near this level until late July. The levels were then slowly reduced to 571.8 by late September and kept at that level the remainder of the year.

Part 2. Vegetation in this unit appeared excellent during the late spring and early summer. However, portions of the cattail stands appeared to be dying in mid-summer, possibly due to high water levels. Water levels were reduced in an effort to improve conditions. Muskrat use of the area in the fall was good.

B.2 Objectives of the 1985 Proposed Water Levels.

This unit will be held stable at approximately 572.0 during the year in an effort to improve emergent growth. Levels may be raised slightly during late July and August for purple loosestrife control if neccessary.

Annual Water Management Plan for 1985

Refuge Darby NWR Water Unit Pool 2

Maximum elevation permissible 573.0

Flowline elevation of lowest drain structure 569.0

Elevation of general pool bottom 570.0

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	573.2	572.9
15	"	"
Feb. 1	"	"
15	573.5	"
Mar. 1	"	"
15	573.3	"
Apr. 1	"	572.7
15	"	"
May. 1	"	572.5
15	573.2	"
Jun. 1	573.3	"
15	573.2	"
Jul. 1	"	"
15	"	"
Aug. 1	573.1	"
15	"	"
Sept 1	"	572.5
15	573.0	"
Oct. 1	"	"
15	"	"
Nov. 1	572.8	"
15	"	"
Dec. 1	"	"
15	572.9	"
31	"	

A.2 Effects of past year's water levels.

Part 1. Water levels were allowed to remain high in this unit most of the year and were at approximately 573.2 throughout the summer period. They had dropped to 572.8 by late fall.

Part 2. Vegetation is in good condition in this pool. Scattered plants of purple loosestife were noted along the southern edge of the pool.

B.2 Objectives of the 1985 Proposed Water Levels.

The water levels will be kept stable in this pool at an elevation of approximately 572.5 which is considerably lower than last year. Levels may be raised in late summer if purple loosestrife control is neccessary.

Annual Water Management Plan for 1985

Refuge Darby NWR Water Unit Pool 3

Maximum elevation permissible 573.0

Flowline elevation of lowest drain structure 569.0

Elevation of general pool bottom 570.0

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	572.6	571.8
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	572.0
15	"	"
Apr. 1	"	"
15	573.0	"
May. 1	"	"
15	"	"
Jun. 1	"	"
15	572.3	"
Jul. 1	"	"
15	572.0	"
Aug. 1	"	"
15	571.8	"
Sept 1	"	"
15	"	"
Oct. 1	571.8	"
15	"	"
Nov. 1	571.7	"
15	"	"
Dec. 1	"	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. Water levels were held quite high in this pool throughout the summer but then dropped during the fall months.

Part 2. Vegetative conditions in this pool were excellent with good interspersion of emergents, submergents, and open water. Waterfowl use was good during the summer and early fall. Muskrat densities were high and resulted in a considerable amount of opening by late fall.

B.2 Objectives of the 1985 Proposed Water Levels.

The water levels in this pool will be held as stable as possible during the entire year. Planned levels will be set at 572.0 which is slightly lower than last year.

Annual Water Management Plan for 1985

Refuge Darby NWR Water Unit Pool 4

Maximum elevation permissible 573.5

Flowline elevation of lowest drain structure 566.6

Elevation of general pool bottom 567.5

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
Jan. 1	571.5	571.5
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	572.1	"
15	"	"
Apr. 1	"	"
15	"	571.0
May. 1	"	"
15	571.9	"
Jun. 1	"	570.0
15	"	"
Jul. 1	"	"
15	572.0	"
Aug. 1	"	"
15	"	"
Sept 1	571.8	"
15	"	"
Oct. 1	571.7	571.5
15	"	572.0
Nov. 1	571.5	"
15	"	"
Dec. 1	"	"
15	571.4	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. Water levels in this pool were low through the winter period and only raised to 572.10 during the spring runoff period and was then lowered to 571.9 by mid-May. It was held at approximately 572.00 until mid-July and then slowly reduced, reaching 571.5 by late fall.

Part 2. This pool contains contains a large open water area with vegetation around the edges. The reduction of water levels in mid-July was an attempt to improve vegetation growth, but little improvement was noted.

B.2 Objectives of the 1985 Proposed Water Levels.

Water levels will be kept as low as possible during the entire spring and summer in an effort to improve vegetative conditions. This will be accomplished by gravity draining as funds and/or manpower are available for pumping. Pumping via contract would be a possibility if funds were available.

Annual Water Management Plan for 1985

Refuge Navarre NWR Water Unit Pool 1

Maximum elevation permissible 573.0

Flowline elevation of lowest drain structure 569.5

Elevation of general pool bottom 568.5

Acreage 130 acres

A.1 Water surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	571.5	571.5
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	"
15	"	"
Apr. 1	"	"
15	571.0	"
May. 1	570.5	571.0
15	570.0	570.5
Jun. 1	569.5	569.5
15	"	"
Jul. 1	"	"
15	"	"
Aug. 1	"	"
15	"	"
Sept 1	"	"
15	570.5	570.0
Oct. 1	571.0	571.0
15	571.5	571.5
Nov. 1	"	"
15	"	"
Dec. 1	"	"
15	"	"
31	"	"

A.2 Effects of past year's water levels.

Part 1. Pool 1 of the Navarre Unit was pumped down as far as possible during April and May. Shallow water still remained in the center of the unit. The pool remained at this level until mid-September when reflooding to 571.5 was done.

Part 2. The pool has good moist soil food production in several areas that were exposed during the summer and good submergent vegetation over much of the deeper water areas. Emergent vegetation is becoming slightly heavy in the eastern portion. A section of the eastern portion is heavy grass cover. Waterfowl use was average and muskrat populations are good.

B.2 Objectives of the 1985 Proposed Water Levels.

This pool will be managed similiar to the levels of 1983 to again generate the moist soil foods in the pool. Water will be remove as much as possible starting approximately late April and held at approximately 569.5 for the summer months.

Reflooding will be done approximately September 15th.

Annual Water Management Plan for 1985

Refuge Navarre NWR Water Unit Pool 2

Maximum elevation permissible 573.0

Flowline elevation of lowest drain structure 569.5

Elevation of general pool bottom 568.5

Acreage 340 acres

Date	A.1 Water surface Elevations for Past Year.	B.1 Planned Elevations for Program Year.
	Water Surface Elevations	Water Surface Elevations
Jan. 1	571.5	571.5
15	"	"
Feb. 1	"	"
15	"	"
Mar. 1	"	"
15	"	"
Apr. 1	"	"
15	"	"
May. 1	571.0	571.0
15	570.5	570.5
Jun. 1	569.5	"
15	"	"
Jul. 1	"	"
15	"	"
Aug. 1	"	"
15	"	"
Sept 1	570.5	"
15	571.0	571.0
Oct. 1	571.5	571.5
15	"	"
Nov. 1	"	"
15	"	"
Dec. 1	"	"
15	"	"
31	"	"

Navarre Pool 2

A.2 Effects of past year's water levels.

Part 1. This pool was drawn down starting in late April and reached a level of 569.5 by June 1st. This is the lowest level that can be removed by pumping and leaves a large area of open water in the center of the unit. Levels were maintained at this level thoughout the summer months and was reflooded to 571.5 approximately Spetember 15th.

Part 2. Some of the areas of this pool which had exposed mudflats had good moist soil food production and the water areas had good submergent vegetation. Lotus beds occur in the portions of the water areas which are not dry in the summer.

Emergent vegetation around the edges of the pool, especially on the east side is becoming very thick and has expanded considerably over the post few years.

Waterfowl use was good, but muskrat populations are relatively low, especially in view of the heavy emergent vegetation.

B.2 Objectives of the 1985 Proposed Water Levels.

This pool will be held at a moderate level during the summer months in a attempt to encourage muskrat populations and reduce the expansion and growth of of emergent vegetation. It is hoped that higher muskrat populations will reduce the emergent vegetation levels during the fall months.

Levels will be held at 571.5 during the spring months and then reduced to 570.5 starting approximately May 1st and held at that level for the summer period. Reflooding to 571.5 sill start approximately September 1st.